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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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David R. Hembree

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EXAMINER

CHU, CHRIS C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 09/933,492	Applicant(s) HEMBREE ET AL.	
	Examiner Chris C. Chu	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nc address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 52 - 62 and 70 - 77 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 52 - 62 and 70 - 77 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on November 8, 2004 has been received and entered in the case.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 52 – 62 and 70 – 77 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 52, 56, 60 and 70, it is unclear what the applicant regards as:

(a) Regarding the limitation “a metal layer on the substrate comprising a plurality of separate patterns of conductors on the components,” the location of the metal layer is not clear (i.e., is the metal layer formed on the substrate or on the components? Or both?).

(i) If this metal layer is formed on the components:

- Is this metal layer part of the integrated circuits or component contacts or not?

- What is the difference between the conductors and component contacts? In other words, is there a single metal layer formed on each one of the component contacts and also called “conductors”?

(ii) If this metal layer is formed on the substrate:

- how is this metal layer in electrical communication with the component contacts?

(b) Regarding the limitation “a metal layer ... in electrical communication with the component contacts configured to redistribute the component contacts on each component;” how is the metal layer configured to redistribute the component contacts on each component?

(c) Regarding the limitation “the separate patterns of conductors containing information;” since patterning a metal layer makes the conductors, how do these patterned metals *contain* information? It is not a term of art to consider a patterned metal layer as “containing” information.

(d) Regarding the limitation “and to repair the defective component by connecting selected component contacts on the defective component with selected integrated circuits on the defective component;” it is not clear how a defective component may be repaired by connecting the defective component with other integrated circuits on the defective component. The limitation states that the component is itself defective, so how can it be repaired by connecting to itself?

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 52 – 62 and 70 – 77 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsuan et al. (U.S. Pat. No. 6,214,630).

Regarding claims 52, 60 and 70, as best as understood by the Examiner, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 a semiconductor component comprising:

- a substrate (semiconductor wafer 100 in Fig. 2) comprising a plurality of semiconductor components (semiconductor IC dice 102; column 4, line 57), each component including a plurality of component contacts (114; column 4, lines 57 – 58) and a plurality of integrated circuits (Integrated circuits, i.e., 110a, 110b, etc in Fig. 4) in electrical communication (by using the element 112) with the component contacts (114; see Fig. 4), the components including at least one defective component (any defective die in Figs. 5 and 6; column 6, lines 29 – 33) identified during a component testing process (first testing process; column 5, lines 48 – 63);
- a plurality of terminal contacts (balls on the element 140; column 6, line 55) on the components (claim 70); and

- a metal layer (claims 52 and 60) or a metal redistribution layer (claim 70; the metal redistribution line 134a or 134b; column 6, lines 25 – 28) on the substrate (100) comprising a plurality of separate patterns of conductors (136 and 140) on the components in electrical communication with the component contacts (114; see Fig. 6) configured to redistribute the component contacts on each component (column 6, lines 25 – 28), to electrically connect the contacts (114) and the terminal contacts (balls on the element 140; column 6, line 55) on each component (102; see Fig. 6), to electrically connect multiple components in a cluster that excludes the defective component (claim 70; column 6, lines 4 – 53), and to repair the defective component by connecting selected component contacts on the defective component with selected integrated circuits on the defective component (column 5, lines 54 – 63), and to reconfigure the component contacts (by redistribution lines 134a and 134b) on the defective component (claim 60; column 6, lines 25 – 34), the separate patterns of conductors containing information from the component testing process for repairing the defective component (in the second repairing process of Hsuan et al., Hsuan et al. uses fuses 136 to repair the inoperative IC block by disconnecting the operative one from the inoperative one to melt way the associated one of the fuses 136. For example, if the fuses 136 are connected, then the IC is operative one. Thus, the fuses 136 read as conductors that contain information of the component testing process; read column 6, lines 29 – 52).

Regarding claim 53, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the components including a second defective component (a second bad die from the

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bad dies; column 6, lines 33 – 34) and the conductors are configured to electrically isolate the second defective component (claim 53; column 3, lines 8 – 15).

Regarding claim 54, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the components (102) including a second defective component (a second bad die from the bad dies; column 6, lines 33 – 34) and the conductors (136 and 140) being configured to reconfigure the component contacts on the second defective component (column 5, lines 54 – 63).

Regarding claim 55, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 53 the components including a second defective component (a second bad die from the bad dies; column 6, lines 33 – 34) and the conductors being configured to electrically connect multiple components in a cluster (wafer level IC) that excludes the second defective component (column 6, lines 11 – 53).

Regarding claim 56, as best as understood by the Examiner, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 a semiconductor component comprising:

- a substrate (semiconductor wafer 100 in Fig. 2) comprising a plurality of components (semiconductor IC dice 102; column 4, line 57), each component comprising a plurality of component contacts (114; column 4, lines 57 – 58);
- the components (102) including a plurality of good components (e.g., any one of the good elements 102) and at least one defective component (any defective die in Figs. 5 and 6; column 6, lines 29 – 33) identified during a component testing process (first testing process; column 5, lines 48 – 63);

- a metal redistribution layer (the metal redistribution line 134a or 134b; column 6, lines 25 – 28) on the substrate comprising a plurality of separate patterns of conductors (136 and 140) on the components configured to redistribute the component contacts (114) on each component and to electrically isolate the defective component (column 7, lines 19 – 30) on the substrate during burn-in testing of the good components (column 6, lines 44 – 53), the separate patterns of conductors containing information from the component testing process for repairing the defective component (in the second repairing process of Hsuan et al., Hsuan et al. uses fuses 136 to repair the inoperative IC block by disconnecting the operative one from the inoperative one to melt way the associated one of the fuses 136. For example, if the fuses 136 are connected, then the IC is operative one. Thus, the fuses 136 read as conductors that contain information of the component testing process; read column 6, lines 29 – 52). Furthermore, the limitation “to electrically isolate the defective component on the substrate during burn-in testing” is functional language that does not differentiate the claimed apparatus over Hsuan et al. Also, Hsuan et al.’s structure performs this function by use of the fuses because the fuses isolate defective components so during any future use -burn-in testing or just plain use- the defective component is isolated.

Regarding claim 57, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 a plurality of terminal contacting (balls on the element 140; column 6, line 55) on the good components (good 102s) in the selected patterns in electrical communication with the conductors (e.g., 140).

Regarding claim 58, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the conductors (136 and 140) being configured to electrically connect a plurality of good components in a cluster (wafer level IC) that exclude the defective component (column 6, lines 11 – 53).

Regarding claim 59, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 the substrate (100) comprising a semiconductor wafer (100; column 4, line 52), and the components (102) comprising semiconductor dice or semiconductor packages (die-IC; column 6, lines 4 – 10).

Regarding claim 61, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 a plurality of terminal contacts (balls on the element 140; column 6, line 55) on the components (102) in electrical communication (by using the element 112) with the conductors (136 and 140) and the component contacts (114; see Fig. 6).

Regarding claims 62 and 76, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the substrate (100) comprising a semiconductor wafer (100) or portion thereof and the components (102) comprising a semiconductor dice (die-IC; column 6, lines 4 – 10).

Regarding claim 71, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the terminal contacts (balls on the element 140; column 6, line 55) comprising balls or bumps and in a plurality of separate grid arrays (column 6, lines 53 – 55).

Regarding claim 72, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the contacts (114) comprising bond pads (column 4, lines 52 – 53).

Regarding claim 73, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the conductors (136 and 140) have a fan out configuration (see Fig. 6).

Regarding claim 74, Hsuan et al. discloses in e.g., Fig. 1, Fig. 5, Fig. 6 and column 6, lines 1 – 34 the substrate (100) comprising a semiconductor wafer (column 4, line 52).

Regarding claim 75, Hsuan et al. discloses in e.g., Fig. 6 and column 6, lines 1 – 34 a protective layer (132a) on the conductors (136 and 140) having a plurality of openings (138) for the terminal contacts.

Regarding claim 77, Hsuan et al. discloses in e.g., Fig. 6 and column 6, lines 1 – 34 the components (102) including a second defective component (a second bad die from the bad dies; column 6, lines 33 – 34) and the conductors being configured to electrically isolate the second defective component (column 6, lines 11 – 53).

Response to Arguments

6. Applicant's arguments with respect to claims 52 – 62 and 70 – 77 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 517-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
Friday, January 21, 2005


GEORGE ECKERT
PRIMARY EXAMINER